
Floodplain/Wetlands Assessment for the Interceptor Trench Field Study near the Weldon Spring Quarry, Weldon Spring Site, Missouri

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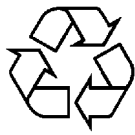
Floodplain/Wetlands Assessment for the Interceptor Trench Field Study near the Weldon Spring Quarry, Weldon Spring Site, Missouri

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NOTATION

The following is a list of the acronyms, initialisms, and abbreviations (including units of measure) used in this report.

ACRONYMS, INITIALISMS, AND ABBREVIATIONS

AMSL	above mean sea level
CFR	Code of Federal Regulations
cm	centimeter(s)
CWA	Clean Water Act
DOE	U.S. Department of Energy
FEMA	Federal Emergency Management Agency
ft	foot (feet)
ha	hectare(s)
km	kilometer(s)
m	meter(s)
m ³	cubic meter(s)
mi	mile(s)
NWI	National Wetlands Inventory
QROU	Quarry Residuals Operable Unit
ROD	Record of Decision
s	second(s)
USFWS	U.S. Fish and Wildlife Service

**FLOODPLAIN/WETLANDS ASSESSMENT FOR THE
INTERCEPTOR TRENCH FIELD STUDY NEAR THE
WELDON SPRING QUARRY, WELDON SPRING SITE, MISSOURI**

by

R.A. Van Lonkhuyzen

ABSTRACT

The U.S. Department of Energy proposes to construct a groundwater interceptor trench near the Weldon Spring Quarry at the Weldon Spring Site in Missouri. The trench would be located near two palustrine wetland areas. Impacts to wetland hydrology and biotic communities are expected to be negligible. No long-term adverse impacts to floodplains are expected.

1 INTRODUCTION

The U.S. Department of Energy (DOE) is currently conducting response actions for the Quarry Residuals Operable Unit (QROU) of the Weldon Spring Site. The site is approximately 48 km (30 mi) west of St. Louis, Missouri. The Weldon Spring Site consists of two noncontiguous areas: (1) the Chemical Plant Area and (2) the Weldon Spring Quarry, which is about 3.9 km (2.5 mi) southwest of the Chemical Plant Area (Figure 1). Both the quarry and the chemical plant are on the National Priorities List of the U.S. Environmental Protection Agency. Cleanup activities at the site include the remediation of the chemical plant and quarry areas.

The quarry was used for the disposal of chemically and radioactively contaminated materials between the 1940s and 1960s. Contaminated bulk materials and soil have been removed from within the quarry as part of another remedial operable unit.

The selected remedy discussed in the Record of Decision (ROD) for the QROU (DOE 1998a) addresses contaminated groundwater in the quarry area and residual soil contaminants at the quarry. The St. Charles County well field, a source of domestic water for the county, is located in the Missouri River floodplain, approximately 183 m (600 ft) southeast of the quarry. The ROD for the QROU (DOE 1998a) outlined field studies for evaluating the effectiveness of technologies to remediate uranium-contaminated groundwater in the quarry area north of the Femme Osage Slough. DOE is proposing to construct a test-scale trench to evaluate the effectiveness of

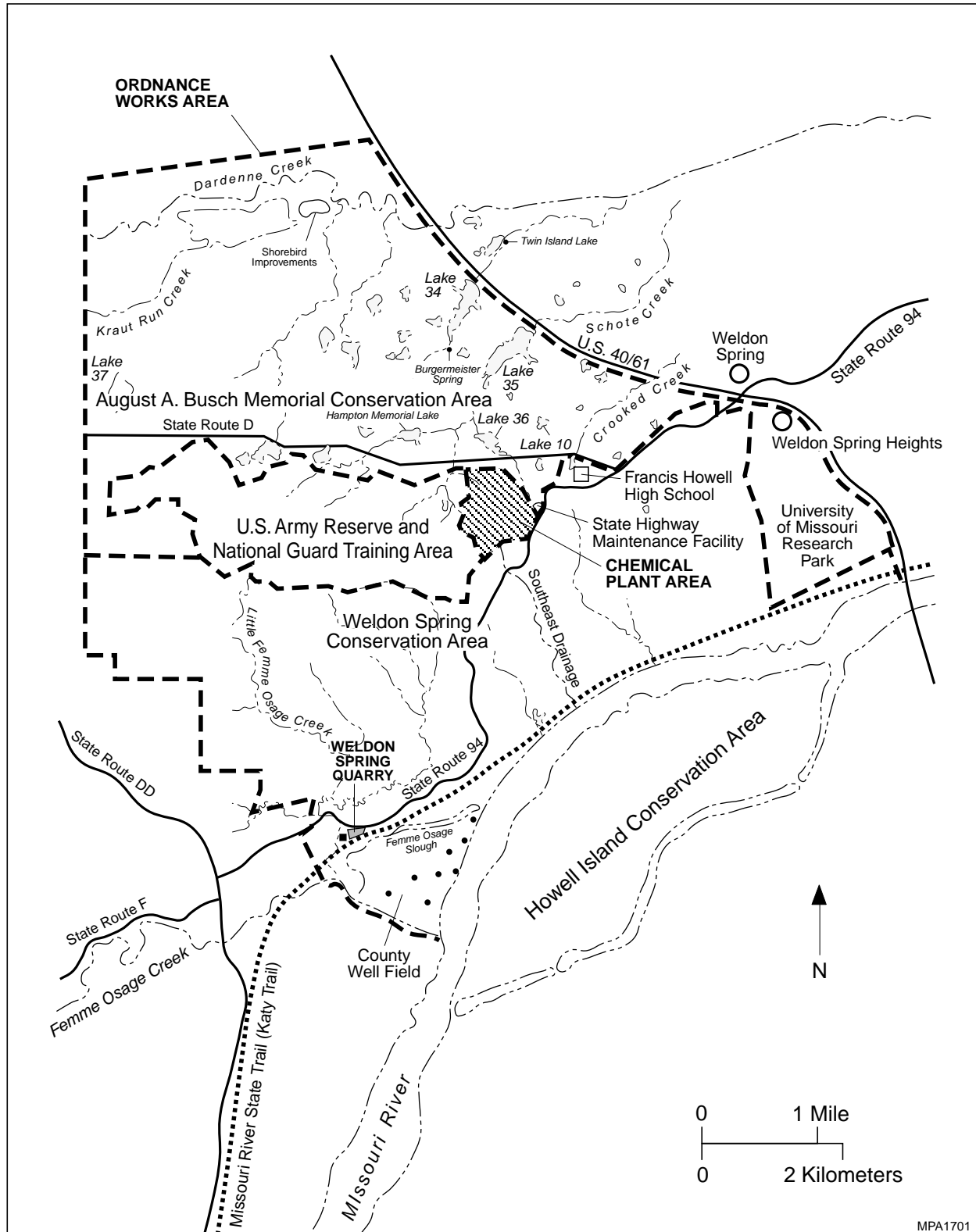


FIGURE 1 Location of the Weldon Spring Quarry

groundwater extraction as a means of remediation. For this field study, the test-scale trench would be constructed between the quarry and the Femme Osage Slough, which is north of the county well field. The trench would be operated for up to two years.

This floodplain/wetland assessment evaluates the potential impacts to floodplains and wetlands from the proposed construction of the interceptor trench. The assessment has been prepared in accordance with Executive Order 11988, *Floodplain Management*, Executive Order 11990, *Protection of Wetlands*, and with DOE guidance and policy (Title 10, *Code of Federal Regulations*, Part 1022 [10 CFR Part 1022]) for compliance with these executive orders.

2 DESCRIPTIONS OF THE PROPOSED ACTION AND ALTERNATIVES

The range of alternatives discussed in this assessment is by necessity limited to the Proposed Alternative and the No Action Alternative. The purpose of constructing the test-scale trench is to determine whether groundwater removal is an effective means of remediating the contaminated groundwater. The contamination has been determined to be located in a floodplain, and locating the trench in a nonfloodplain area would not serve the purpose of adequately intercepting contaminated groundwater.

2.1 PROPOSED ACTION

Elevated levels of uranium occur in groundwater in the vicinity of the Weldon Spring Quarry and extend to the Femme Osage Slough, approximately 107 m (350 ft) south of the quarry. The slough lies south of the Katy Trail and immediately north of the St. Charles County well field. Under the proposed action, a test-scale groundwater interceptor trench would be constructed south of the quarry and immediately north of Femme Osage Slough, within the State of Missouri Weldon Spring Conservation Area (Figure 2). The trench would intersect groundwater levels and provide continuous groundwater access for a groundwater extraction system. The extraction system would remove contaminated groundwater from the trench and direct it to the quarry water treatment plant. The rate of extraction has not been determined but is expected to be quite low. Several test wells in the vicinity of the proposed trench yielded no more than $3.15 \times 10^{-5} \text{ m}^3/\text{s}$ (0.5 gallon per minute [gpm]) (DOE 1998b).

The interceptor trench would be constructed roughly parallel to the Katy Trail and would be approximately 168 m (550 ft) in length and 0.3 m (1 foot) in width. The trench would extend downward to the bedrock layer, approximately 3.0 to 7.6 m (10 to 25 ft) below the ground surface and intersect the alluvial groundwater layer. A soil cover would be placed over the trench to prevent public access and introduction of precipitation. Erosion controls would be installed down gradient from the construction area to prevent the transport of silt downstream by storm water flows. The trench and groundwater extraction system would remain in place for about two years.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, a groundwater interceptor trench field study would not be undertaken, and a trench would not be constructed. No potential changes to the floodplains are expected beyond those that are naturally occurring.

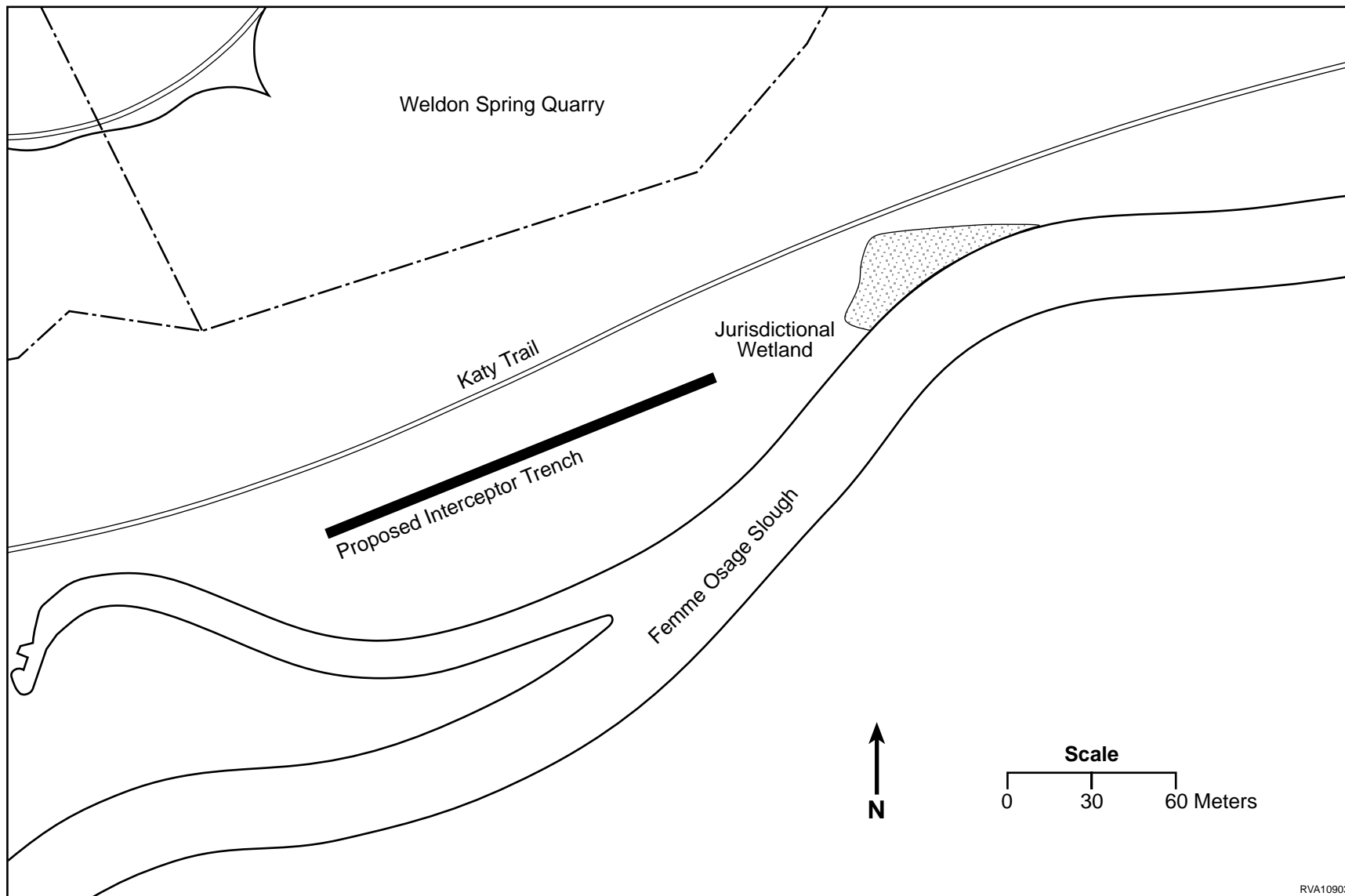


FIGURE 2 Location of the Proposed Groundwater Interceptor Trench and Adjacent Wetlands

3 DESCRIPTIONS OF FLOODPLAINS AND WETLANDS OF THE PROPOSED TRENCH SITE

3.1 DESCRIPTION OF FLOODPLAINS

The 100-year floodplain of the Missouri River is relatively flat and extends to the base of the escarpment immediately northwest of the Katy Trail (FEMA 1992). The proposed interceptor trench would be located entirely within the 100-year floodplain. The 100-year flood elevation in the vicinity of the proposed trench is approximately 144 m (473 ft) above mean sea level (AMSL). Located within the floodplain and to the southeast of the proposed trench are Femme Osage Slough and the St. Charles County well field. Surface elevations of the well field range from approximately 138 to 141 m (451 to 462 ft) AMSL. A levee (elevation approximately 143 m [470 ft] AMSL) is located along the Missouri River and borders the county well field, extending northwest along Femme Osage Creek and Little Femme Osage Creek to the Katy Trail. The levee is designed to reduce the frequency of flooding within the well field, although inundation of the well field occurred in 1989, 1993, 1994, and 1995. Floodplain soil in the vicinity of the proposed trench is Waldron Silty Clay (Tummons 1982), which is classified as a mesic aerice fluvaquent. Waldron Silty Clay is a slowly permeable soil formed in clayey alluvium. This soil is somewhat poorly drained, with rare flooding for brief durations.

The dominant vegetation of the Missouri River floodplain consists of agricultural fields interspersed with deciduous forest. Forest community species in the area of the proposed trench include silver maple (*Acer saccharinum*), box elder (*Acer negundo*), cottonwood (*Populus deltoides*), and American elm (*Ulmus americana*).

3.2 DESCRIPTION OF WETLANDS

The area between the proposed trench and Femme Osage Slough contains a small wetland approximately 0.05 ha (0.13 acre) in size (Figure 2). This wetland would be classified as a palustrine wetland that is seasonally flooded (Cowardin 1979). It is typically inundated by shallow surface water for extended periods early in the growing season; however by mid- to late summer, no surface water is present. The hydrological source for this wetland is primarily groundwater discharge; surface-water flow is a minor additional source. As groundwater levels rise during the spring, the surface water of the wetland usually becomes continuous with the surface water of the slough. The dominant vegetation within the wetland area consists of hydrophytic species and includes immature silver maple, cottonwood, and green ash (*Fraxinus pennsylvanica*). No state or federally listed threatened, endangered, or rare species have been found, or are expected to occur, in this area. This wetland constitutes the remainder of a larger wetland that previously existed on this site. In 1995, contaminated topsoil, approximately 0.3 m (1 ft) in depth, was excavated from a 0.64-ha (1.6-acre)

area, including a portion of a 0.10-ha (0.25-acre) wetland (authorized under Nationwide Permit No. 38 of Section 404 of the Clean Water Act [CWA]), and was replaced with clean fill material (Van Lonkhuyzen 1995).

Femme Osage Slough, the former streambed of Femme Osage Creek, is a palustrine, unconsolidated bottom, permanently flooded wetland identified by the National Wetlands Inventory (NWI) (USFWS 1989) as an unconsolidated bottom, lower perennial riverine wetland that is permanently flooded. The slough has steep banks along most of its perimeter and is unvegetated. Consequently, the area of the slough in the vicinity of the proposed trench is not a jurisdictional wetland under current U.S. Army Corps of Engineers guidelines (Environmental Laboratory 1987). However, the slough would be classified as “waters of the U.S.” and, thus, is protected under Section 404 of the CWA. The area between Femme Osage Slough and the Katy Trail, including the location of the proposed trench, is identified by the NWI (USFWS 1989) as forested, broad-leaved deciduous, palustrine wetland that is temporarily flooded. However, this area, with the exception of the wetland discussed above, does not exhibit indicators of wetland hydrology, hydric soils, or dominance of hydrophytic vegetation and, therefore, would not be considered a jurisdictional wetland.

4 ANTICIPATED IMPACTS TO FLOODPLAINS AND WETLANDS

4.1 IMPACTS TO FLOODPLAINS

4.1.1 Impacts of the Proposed Action

No long-term adverse impacts to the 100-year floodplain of the Missouri River would be expected under the proposed action. The floodplain would be temporarily disturbed, however, during construction of the trench. Sediment and erosion controls such as silt fencing and silt dikes would prevent disturbance to adjacent areas of the floodplain. No permanent aboveground structures would be constructed within the floodplain. Thus, no change in flood storage capacity would occur.

4.1.2 Impacts of the No Action Alternative

No impacts to the flood storage capacity of the Missouri River 100-year floodplain would be expected under the No Action Alternative. No impacts to the floodplain are expected beyond those that are naturally occurring or incurred by non-DOE activities.

4.2 IMPACTS TO WETLANDS

4.2.1 Impacts of the Proposed Action

Test wells in the vicinity of the proposed trench show a low hydraulic conductivity (the rate at which water moves through the soil), 10^{-5} to 10^{-3} cm/s, with lower values in the shallower wells. Fine-grained materials, such as silt deposits, are generally located at these shallow depths; coarse-grained materials occur at greater depths (DOE 1998b).

Although groundwater hydrology in the immediate vicinity of the proposed interceptor trench would be expected to change as a result of operation of the groundwater extraction system, impacts to groundwater flow in the shallow soil layers in the vicinity of nearby wetlands would be negligible. Therefore, during the two-year operation of the trench, hydrologic characteristics, including the frequency and duration of flooding, within the portion of Femme Osage Slough in proximity to the trench, or within the adjacent wetland, are expected to remain similar to historical conditions. Thus, wetland functions are expected to remain unchanged.

4.2.2 Impacts of the No Action Alternative

Under the No Action Alternative, the alluvial soils south of the quarry would remain undisturbed. Groundwater characteristics and, therefore, wetland hydrology between the Katy Trail and Femme Osage Slough would remain unchanged.

4.3 MITIGATION AND PERMITTING

DOE has initiated consultations with the U.S. Army Corps of Engineers for a determination of the permits and conditions that would be required for compliance with Section 404 of the CWA. A storm water control plan would be implemented to prevent sedimentation and erosion impacts to adjacent floodplain areas and surface waters. All equipment and road surfaces would be decontaminated, as necessary, following completion of project activities.

5 CONCLUSIONS

The proposed action would not be expected to result in adverse impacts to the Missouri River 100-year floodplain. Temporary disturbance within the floodplain would cease following completion of construction activities. Impacts to the hydrologic characteristics of Femme Osage Slough and an adjacent wetland, approximately 0.05 ha (0.13 acre) in size, are expected to be negligible.

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